


# Web Site Accessibility At Institutions Of Higher Education: An Introduction To Accessibility Awareness

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## Abstract

*The proliferation of information in electronic format does not guarantee its accessibility. The fact that many Web sites are not accessible to large segments of the disabled community has created a digital divide. Web accessibility is especially important in University communities, since the Internet and the digitization of information have changed the ways education is delivered. Over 9 percent of entering freshmen reported disabilities in 1998. There have been significant developments in the field of accessible design, legislation and institutional effort to remove inaccessibility of Web sites. But this research reveals that by far the majority of people surveyed in a representative University community are unaware of these developments, although they are positive that removing any inaccessibility will be a wise and mutually beneficial step. As aging of America continues, the number of people with disabilities is expected to increase.*

## Introduction

 ver the last decade advancements in Web-based technology have created countless benefits in the field of education. Institutions of higher education now offer a plethora of services to students through their web sites, and students greatly benefit from these services. Unfortunately Web sites of many of these institutions are inaccessible to people with disabilities (Fowlers, 2000). The potential of the Internet to broaden the lives and increase the independence of people with disabilities has not been fully utilized for the vast majority of people with disabilities (Kaye, 2000). People with disabilities who have the potential to access the Web sites of institutions of higher education are one such segment. But research has shown that Web sites can be made accessible to people with disabilities by following well-established guidelines (W3C).

The purpose of this research is to identify whether or not there is any lack of awareness about the inaccessibility of Web sites within the community of institutions of higher education. Additionally, it also measures how the students, faculty and other members of an institution of higher education feel about an appropriate action being taken to make Web site of institutions of higher education accessible. Disabling conditions affect some 750 million people worldwide. As the aging of generation continues, the number of people with disabilities may increase significantly (Romano, 2002). Over 9 percent of all full-time first-time students enrolled in the fall of 1998 reported some form of disability. Institutions of higher education need to address this issue for all the community stakeholders as a forward-looking step.

## Literature Review

### *Statistical Perspective: People with Disability*

Disabling conditions affect some 750 million people worldwide (Larkin, 2000). US Census Bureau indicates that 19.3 percent of the 257.2 million people aged 5 and older have some type of disability. People with disabilities comprise the largest minority in the US (Riley, 2002), and those over 65 are more likely to have a

disability (Riley, 2002; Romano, 2002; US Census Bureau, 2003). As the aging of the generation continues, the number of people with disabilities may increase significantly (Romano, 2002). This also indicates that people without disability may eventually become disabled as they near the age of 65.

"People with disabilities are perhaps the single segment of society with the most to gain from the new technologies of the electronic age" (Kaye [2], 2000, p. 13). Unfortunately, only 25% of people with disabilities own computers and only 10% ever make use of the Internet (Kaye [1], 2000). Kaye (2000) also indicates that the vast majority of people with disabilities are unable to take advantage of the advancements in Web based technology. The potential of the Internet to broaden their lives and increase their independence has not been fully utilized (Kaye, 2000).

US National Center For Education Statistics in its Statistical Analysis Report, June 1999 mentioned that in 1998, 154,520 freshmen reported disabilities. This number is 9 percent of all full-time, first-time students enrolled in the fall of 1998. The accessibility issue for students with disabilities is very important.

### *Technology for People with Disability*

An accessible information technology system is one that can be operated in a variety of ways and does not rely on a single sense or ability of the user. For example, a system that provides output only in visual format may not be accessible to people with visual impairments and a system that provides output only in audio format may not be accessible to people who are deaf or hard of hearing. Some individuals with disabilities may need accessibility-related software or peripheral devices in order to use systems that comply with Section 508. Many people with disabilities use assistive technology to enable them to use computers and access the Internet. Blind people who cannot see computer monitors may use screen readers – devices that speak the text that would normally appear on a monitor. People who have difficulty using a computer mouse can use voice recognition software to control their computers with verbal commands. People with other types of disabilities may use still other kinds of assistive technology. New and innovative assistive technologies are being introduced every day.

The Internet and the World Wide Web offers students with disability an opportunity to become more independent. Students with disability can access a Web site to take courses online with a learning system and conduct research by accessing library resources. But If a Web site is not developed in an accessible manner, technology or assistive technology cannot help to make it accessible. Instead it creates unnecessary barriers for people with disabilities, just as poorly designed buildings prevent some from entering.

### *Impact of the Internet on Accessibility of University Resources*

For an educational institution accessibility becomes of critical importance, as the Internet and the digitization of information have transformed the way universities disseminate information and deliver educational services (Schmetzke, 2001). Distribution of education supporting resources by e-mail, web-mediated distance education programs and remote access to library resources are some of the most important services to mention. One prominent trend is clear - universities are continuously embracing web-based technologies for delivery and presentation of print-based content (Schmetzke, 2001). The shift from the physical to the virtual permeates almost all aspect of operation of any university. There is hardly a single library resource category that has not shifted, to at least some extent, to a digitized, web-based format. Online catalogs, indexes and full-text article databases, encyclopedias and other reference works, reserve materials as well as information about the library itself (schedules, people contacts, library tutorials, and help screen) are now commonly accessed through library web sites (Schmetzke, 2001).

Learning System Accessibility Cann, Ball & Sutherland (2003) shows that learning system vendors are maintaining "strong commitments" to improving accessibility of their products in response to the legislative requirements of Section 508. Cann et al. (2003) also shows that US vendors such as Blackboard and WebCT are ahead in providing accessibility options, and the UK vendors such as COSE, FDE Learning Environment and LearnWise have made recent strides in improving the accessibility of their products offering virtual learning environments (VLE). Their paper stresses the need for considering accessibility as a factor before purchasing new VLEs, and that institutions who have already purchased a VLE should to work with the vendors to ensure equal accessibility (Cann et al., 2003).

Library Aggregator Database Accessibility At its 2001 midwinter meeting, the American Library Association adopted the Library Services for People with Disabilities Policy (ALA, 2001). The policy states in part that libraries should use strategies based on the principles of universal design to ensure that library policy, resources and services meet the needs of all people. Providing information resources to everyone equally is one of the fundamental beliefs inherent in the library profession. However, a study on web accessibility of Libraries shows a contradicting result. Riley (2002) analyzed three Library aggregator databases namely EBSCOhost, InfoTrac and First Search Electronic Collections Online (ECO). The analysis shows that none of the databases tested offers a perfect accessibility option for clients with visual impairment. Conclusions suggest that aggregator databases do not follow the accessibility guidelines and consequently are not supplying accessible products (Riley, 2002).

### *Legal Mandate*

The US government has promulgated many laws in providing better access for people with disability in the physical space. According to A Guide to Disability Rights Law, Fair Housing Act as amended in 1988 prohibits housing discrimination and requires provisioning for the disabled. The Air Carrier Access Act requires domestic and foreign carriers to address a wide range of issues including boarding assistance and accessibility features. The Voting Accessibility for the Elderly and Handicapped Act of 1984 requires polling places across the United States to be physically accessible to people with disabilities for federal elections. The Architectural Barriers Act (ABA) requires that buildings and facilities that are designed, constructed, or altered with Federal funds, or leased by a Federal agency, comply with Federal standards for physical accessibility. Noticeably, these laws have greatly contributed in removing the barriers to accessibility in the physical space.

As a great consumer of technology, The US government has promulgated laws to ensure access to telecommunications and technology. The Telecommunications Act of 1996 and its amendments ensure that people with disabilities will have access to a broad range of products and services such as telephones, cell phones, pagers, call-waiting, and operator services that were often inaccessible to many users with disabilities. Section 508 of the Rehabilitation Act requires federal electronic and information technology to be accessible to people with disabilities, including employees and members of the public.

Clearly law is a compelling reason to make technology as well as web sites accessible to people with disabilities. The Americans with Disabilities Act, 1990 (ADA) prohibits discrimination on the basis of disability. The US government has proposed guidelines to ensure Web sites and other information technology accessible to all individuals (Romano, 2002). Starting in 1996, the Department of Justice issued an opinion stating that ADA applies to Web access: "Covered entities under the ADA are required to provide effective communication, regardless of whether they generally communicate through print media, audio media, or computerized media such as the Internet. Covered entities that use the Internet for communications regarding their programs, goods, or services must be prepared to offer those communications through accessible means as well" (Waddel & Thompson, 1998). The 1996 Telecommunication Act demands access to the Internet for the disabled. Consonant with both of these acts is section 508 of the Federal Rehabilitation Act, which states that all government-funded Requests for Purchase (RFP) must include provisions to meet technology needs of individuals with disabilities (Romano, 2002).

### *Government Initiative*

Section 508 of the Rehabilitation Act, as amended in August 1998, requires the Attorney General to report to the President on accessibility of federal electronic and information technology (EIT). Those include federal Web sites, telecommunications, software, hardware, printers, fax machines, copiers, and information kiosks. Federal agencies are therefore required to design their Web sites to meet accessibility guidelines, under the Rehabilitation Act of 1973. Section 508 prohibits federal agencies from procuring, developing, maintaining, or using EIT that is inaccessible to people with disabilities, subject to an undue burden defense. "Undue burden" generally means a significant difficulty or expense (United States Department of Justice [2]). Clearly federal agencies are serious. Elges (2003) mentions, "You may soon be required – or at least expected – to make your Web site accessible to people with disabilities. Doing so will reap unexpected rewards"

### *Web Content Accessibility Guidelines*

With the rapid changes in the Internet and in assistive technologies used by people with disabilities to access computers, private and government organizations have worked to establish flexible guidelines for accessible web pages that permit innovation to continue. The World Wide Web consortium has developed Web site accessibility guidelines (W3C [1], 2003). Those who follow these criteria will find that their sites are more optimized for search engines, are more readily available to more people, are easier to maintain, have improved efficiency, and demonstrate social responsibilities and reduce legal liabilities (Elges, 2003).

The research questions for the study begin to measure the level of awareness among the community of institutions of higher education. The community includes three important segments – faculty, students and others employed. The questions specifically try to address the level of awareness in the field of technology, legal requirements and government initiatives for accessibility. It also addresses how the community feels about an accessible web site for their institution. The research has a second aim of creating awareness of issues relating to accessibility for people with disability.

The study first identified a Web site of a large private institution of higher education. The Web Site was analyzed for accessibility by using a commonly available accessibility validation tool. At the same time, members of the University communities of a number of similar institutions were surveyed, using an online instrument, to measure their awareness of Web site accessibility.

The University that was selected for an accessibility check was chosen because of its commitment to students with disability. In its Web site, for example, the University makes a commitment to ensure fullest possible access to its quality education programs and facilities. The Web site includes the statement that the "University strives to meet the special needs of students with disabilities, and to ensure access to educational and other programs and facilities that are open and available to all [...] students" (University Web site, 2003).

## **Methodology**

### *Accessibility Validation*

The study used an accessibility validation tool called Bobby to measure the accessibility of seven frequently accessed Web pages. The Center for Applied Special Technology (CAST) created Bobby to assist people in checking the accessibility of their web pages. For each page checked, Bobby provides information pertaining to the type, number, and location of accessibility errors based on the priorities listed by W3C's Web Content Accessibility Guidelines (WCAG) 1.0. If a web page has any **priority 1** accessibility errors as described in WCAG, the page is invalidated by Bobby and is ranked as inaccessible to people with disability.

Bobby analyzes accessibility based on the W3C WAI Web Content Accessibility Guidelines. Each of the 14 major guidelines (W3C) has checkpoints to explain how the guideline applies in typical content development

scenarios. Each checkpoint has a priority level assigned by the Working Group based on the checkpoint's impact on accessibility. Priority levels range from 1 to 3.

**[Priority 1]** A Web content developer **must** satisfy this checkpoint. Otherwise, one or more groups will find it impossible to access information in the document. Satisfying this checkpoint is a basic requirement for some groups to be able to use Web documents.

**[Priority 2]** A Web content developer **should** satisfy this checkpoint. Otherwise, one or more groups will find it difficult to access information in the document. Satisfying this checkpoint will remove significant barriers to accessing Web documents.

**[Priority 3]** A Web content developer **may** address this checkpoint. Otherwise, one or more groups will find it somewhat difficult to access information in the document. Satisfying this checkpoint will improve access to Web documents.

### *Scope of Investigation*

Seven representative web pages were evaluated for compliance with W3C Web Content Accessibility Guidelines. These were:

- Home page
- One campus page
- One School/College Page
- Registration Page
- Student E-Mail Page
- Library Page
- Student with Disabilities Page.

The reason for selection of these pages is because of the belief that most students very frequently visit these pages, and these kinds of pages serve as gateways to many services offered by the institutions of higher education.

If a page contained a frame all pages within the frame have been evaluated. For each site, Bobby was set to check the current page without looking at the next layer of hyperlinked pages for accessibility errors. Only pages without any major [Priority 1] accessibility problems were rated Bobby-approved.

### *Terminological Clarification*

The ADA defines a disability as:

- A physical or mental impairment that substantially limits one or more major life activities;
- A record of such impairment; or
- Being regarded as having such impairments (US Department of Justice, 1990).

The following terms have been used interchangeably.

- "Information systems" and "information technology"
- "Disability" and "disabling conditions"
- "Institutions of higher education" and "universities"
- "Bobby-approved" and "accessible"

## Findings

### *Accessibility Validation*

The results of the Bobby analysis of this University Web site are dismaying. There are nine [priority 1] errors in these critical pages and 26 [priority 2] errors. With [priority 1] access errors, one or more groups will find it impossible to access the information. Only the student email site is without [priority 1] errors. Nevertheless, it has two [priority 2] errors. With [priority 2] errors, one or more groups will find it difficult to access the information.

Page Title	Result	Priority 1	Priority 2	Priority 3
Home Page	Inaccessible	1	2	N/A
Campus Pages	Inaccessible	2	4	N/A
School/College Pages	Inaccessible	1	5	N/A
Registration Page	Inaccessible	1	4	N/A
Student E-Mail Page	Inaccessible	0	2	N/A
Library Page	Inaccessible	3	5	N/A
Student with Disabilities Page.	Inaccessible	1	4	N/A
<b>Overall</b>	<b>Inaccessible</b>	<b>9</b>	<b>26</b>	<b>N/A</b>

**Table 1: Result of accessibility validation on frequently visited Web pages**

Since none of these pages were free of [Priority 1 and 2] errors, the tool did not check for [priority 3] errors. These findings are particularly unsettling since this University is committed to meeting the special needs of students with disabilities, and to “ensure access to educational and other programs and facilities that are open and available to all...” (2003).

### *Awareness Survey*

- 31 individuals participated in the awareness survey. Among, the participants, there were 11 faculty members, 18 student and 2 other staff. 8 participants or reported that they or a member of their family had some disability. The percentage (26%) of reported disability comes slightly higher than those reported by US Census Bureau (19.3%). However we believe that a larger sample size may closely match the percentage.
- 12 out of 30 participants reported having any knowledge of any technology that can assist a person to read web pages. These 12 responses specifically mentioned enabler technology such as screen reader and voice recognition software that can assist a blind person to read Web pages.
- Only 5 out of 30 respondents reported any awareness of any legal requirements in connection with accessibility of Web sites for people with disabilities. Only 2 out of those who reported legal awareness could reference an act or a section of any act. Only one person referenced W3C showing that awareness about existing institutions or government organization was worse than those reported for the previous issues.
- 29 people responded to a question on having any awareness of government initiative. Only one responded to a specific funding initiative by government.
- When asked to provide opinion about the accessibility of the respondent's university Web site, 16 out of 31 respondents selected “Do not know about this”, showing their lack of awareness.

<b>Q. Please provide your opinion about the accessibility of your University Web Site for people with disabilities.</b>	<b>Responses</b>
Highly Accessible	4
Somewhat Accessible	9
Inaccessible	2
Do not know about this	16
<b>Total</b>	<b>31</b>

Table 2: Opinion about the state of Web site accessibility

- When asked about probable causes of any inaccessibility of their own university Web site, the responses came out as tabulated below. Most participants of the awareness survey responded “Never thought about this” when asked about reasons for absence of Web content accessibility policy from their university. Absence or lack of enforcement of Web content accessibility laws and conflict of accessible design with creative design principles received the second highest “Never thought about this” responses with 12 for each item.
- 11 participants responded with “Strongly agree” or “agree” on lack of money and lack of developer knowledge as probable causes of any inaccessibility. Enforcement of web content accessibility law received 10 “agree” responses.

<b>Q. Please indicate how much you agree or disagree with the following statements as causes for any inaccessibility of your University Web Site for people with disabilities.</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Never Thought About This</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Absence of Web content accessibility policy from your University authorities	8	4	14	2	3
Lack of money that is necessary to make your University Web Site accessible	4	11	8	6	2
Lack of developer knowledge in principles of accessible design	4	11	9	6	1
Absence of or lack of enforcement of Web content accessibility laws	4	10	12	3	1
Conflict of accessible design with creative design	3	8	12	5	3

Table 3: Opinion about the causes of inaccessibility

- On a more positive note 30 out of 31 respondents thought that making university Web site accessible for people with disabilities would be mutually beneficial.

<b>Q. How would you describe your opinion on the proposition that making your University Web Site accessible for people with disabilities will be mutually beneficial to your University and students with disabilities?</b>	<b>Responses</b>
Strongly Agree	16
Agree	14
Disagree	1
Strongly Disagree	0
<b>Total</b>	<b>31</b>

Table 4: Opinion making Web site accessible

- 16 out of 30 participants thought that a university authority's decision to remove any inaccessibility considering the fact that most people after 65 years of age encounter some type of disability, would be very wise or wise. 7 people thought that such decision would be appropriate. 1 participant reported that a decision to remove any inaccessibility would be "somewhat necessary" and 6 people reported that the decision would be "unnecessary".

<b>Q. Considering the fact that most people after the age of 65 encounter some type of disability, how would you describe any decision of your University to remove any inaccessibility of the University Web Site?</b>	<b>Responses</b>
Very Wise	13
Wise	3
Appropriate	7
Somewhat necessary	1
Unnecessary	6
<b>Total</b>	<b>30</b>

Table 5: Opinion about removal of inaccessibility

## Discussion

The most salient findings of this research are the stark contrasts between the level of commitment of this University to meeting the needs of the disabled for access to all facilities, including their Web site, and the awareness levels of the communities involved in providing the access. First, the web designers are clearly not providing Web site accessibility as evidenced by the 9 [priority 1] and the 26 [priority 2] accessibility errors located by Bobby. To complicate matters further, the majority of those surveyed express a comprehensive lack of awareness about accessibility for people with disability. It is likely that this lack of awareness is contributing to the difficulties in creating Web sites with accessibility, since making Web sites accessible is relatively simple

When asked how much they agree or disagree with statements as causes for any inaccessibility of their University Web site, the majority answer was "Never thought about this". Equally dismal was the opinion of the participants' who responded to the question on the level of accessibility of their Web site. The majority answer was "Do not know about this".

Nevertheless, on the positive side most of the respondents thought that removing any Web site inaccessibility would be wise and beneficial. There was not any strong disagreement on the proposition that making University Web site accessible for people with disabilities will be mutually beneficial. Rather, the majority thought the opposite is true and a decision to remove any inaccessibility would be a positive move. However there were 6 responses that indicated such move would be inappropriate. This number shows that the move to decision to invest resources in making Web sites accessible may face some resistance. Nevertheless, there were specific comments that as colleges now market non-credit programs for above-65 age group, it is important to think of this audience and their possible limited sight, erratic movement of mouse peripherals and other partly disabling conditions when designing a web site.

The lack of awareness evidenced by these University community members was unexpected. All these individuals have some knowledge of technology access and are part of Universities saturated with digitized information. The University whose Web site was analyzed has copious online offerings. In some schools all courses are web-enhanced, and online programs are offered in both graduate and undergraduate degree and non-degree programs.

## Conclusions And Suggestions For Future Research

These results show the necessity for developing awareness in university communities, since commitment alone is not shown to be effective in creating accessibility. The results reveal the disconcerting conclusion that neither the builders nor the users are sufficiently aware of accessibility issues for persons with disability to initiate remedial actions.

This research study surveyed a very small sample of the entire available population, and a larger sample would therefore result in more representative conclusions. However, this study strongly indicates that there is a far-reaching lack of awareness among the faculty and students of institutions of higher education that were surveyed. Nevertheless, most participants responded positively that it would be a wise decision on the part of university authorities to remove any inaccessibility and that doing so will be mutually beneficial for university students, faculty and authorities.

The intention of this research stream is not only to measure web site accessibility awareness but also to create awareness in university communities about issues of accessibility for people with disability. Future research therefore requires longitudinal studies to capture differences in awareness levels over time. Furthermore, it is desirable to understand accessibility awareness profiles in the other stakeholder communities such as the alumni and the external communities the universities serve, and create awareness.

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